CLAIMS

I claim:

[c1] A portable power module trailerable over public roads, the portable power module comprising:

a gaseous fuel motor including a combustion chamber and a coolant jacket positioned adjacent to the combustion chamber to circulate liquid coolant;

an electrical power generator drivably connected to the gaseous fuel motor, the generator configured to produce at least one megawatt of electrical power when driven by the gaseous fuel motor at a selected speed in a normal operating configuration;

a radiator in flow communication with the coolant jacket, the radiator configured to receive the coolant from the coolant jacket and return the coolant to the coolant jacket;

an exhaust gas silencer in flow communication with the combustion chamber, the exhaust gas silencer configured to receive exhaust gases from the combustion chamber and discharge the exhaust gases; and

a container trailerable over public roads, the gaseous fuel motor, the generator, the radiator and the exhaust gas silencer being positioned inside the container when the portable power module is in the normal operating configuration.

[c2] The portable power module of claim 1 wherein the container has an overall length dimension of about 40 feet or less, an overall width dimension of about 8 feet or less, and an overall height dimension of about 9.5 feet or less.

[c3] The portable power module of claim 1 wherein the container is a standard forty foot shipping container.

[c4] The portable power module of claim 1 wherein the gaseous fuel motor has a combustion air intake in flow communication with the combustion chamber, and further comprising an air provision system configured to provide ambient air to the combustion air intake for combustion and to provide ambient air to the radiator to cool the coolant received from the coolant jacket.

[c5] The portable power module of claim 1 wherein the gaseous fuel motor has a combustion air intake in flow communication with the combustion chamber and the combustion air intake is configured to receive a first air portion, wherein the generator further includes a generator air intake configured to receive a second air portion, wherein the radiator is configured to receive a third air portion, and wherein the portable power module further comprises:

a first air circuit configured to provide the first air portion to the combustion air intake and the second air portion to the generator air intake; and

a second air circuit configured to provide the third air portion to the radiator.

[c6] The portable power module of claim 1 wherein the gaseous fuel motor has a combustion air intake in flow communication with the combustion chamber and the combustion air intake is configured to receive a first air portion, wherein the generator further includes a generator air intake configured to receive a second air portion, wherein the radiator is configured to receive a third air portion, and wherein the portable power module further comprises:

a first air circuit configured to provide the first air portion to the combustion air intake and the second air portion to the generator air intake; and

a second air circuit configured to provide the third air portion to the radiator, the second air circuit being isolated from the first air circuit

to avoid mixing the third air portion with the first or second air portions.

[c7] The portable power module of claim 1 wherein the gaseous fuel motor has a combustion air intake and a gaseous fuel inlet in flow communication with the combustion chamber, the combustion chamber being configured to combust a fuel/air mixture comprising natural gas received via the gaseous fuel inlet and air received via the combustion air intake.

[c8] The portable power module of claim 1 further comprising a trailer chassis supporting the container and having a tandem axle rear wheel-set and a forward coupling, the coupling being releasably attachable to a transport vehicle for movement of the portable power module over public roads.

[c9] The portable power module of claim 1 wherein:

the generator produces at least approximately one megawatt of electrical power at 50 Hz when driven by the motor at a speed of 1500 RPM; and

the generator produces at least approximately one megawatt of electrical power at 60 Hz when driven by the motor at a speed of 1800 RPM.

[c10] The portable power module of claim 1 wherein the motor has a first motor speed associated with a first generator output frequency and a second motor speed associated with a second generator output frequency, the portable power module further comprising a frequency switching system, the frequency switching system allowing selection of the first generator output frequency by selecting the first motor speed or the second generator output frequency by selecting the second motor speed.

[c11] The portable power module of claim 1 wherein the gaseous fuel motor has a combustion air intake and a gaseous fuel inlet in flow communication with the combustion chamber and further comprising a turbocharger having a first configuration and a selectable optional second configuration, the first configuration including a driven portion mechanically coupled to a first driving portion and the second configuration including the driven portion mechanically coupled to a second driving portion that is optionally interchangeable with the first driving portion, the driven portion being connected in flow communication with the combustion air intake, the gaseous fuel inlet and the combustion chamber, and the first and second driving portions being connectable in flow communication with the combustion chamber.

[c12] The portable power module of claim 1 wherein the gaseous fuel motor has a combustion air intake and a gaseous fuel inlet in flow communication with the combustion chamber and further comprising a turbocharger having a first configuration and a selectable optional second configuration, the first configuration including a driven portion mechanically coupled to a first driving portion and the second configuration including the driven portion mechanically coupled to a second driving portion that is optionally interchangeable with the first driving portion, the driven portion being connected in flow communication with the combustion air intake, the gaseous fuel inlet and the combustion chamber, and the first and second driving portions being connectable in flow communication with the combustion chamber, wherein the first configuration results in a first motor speed and the second configuration results in a second motor speed.

[c13] The portable power module of claim 1 wherein the gaseous fuel motor has a combustion air intake and a gaseous fuel inlet in flow communication with the combustion chamber and further comprising a turbocharger having a first configuration and a selectable optional second configuration, the first configuration including a driven portion mechanically coupled to a first driving

portion and the second configuration including the driven portion mechanically coupled to a second driving portion that is optionally interchangeable with the first driving portion, the driven portion being connected in flow communication with the combustion air intake, the gaseous fuel inlet and the combustion chamber, and the first and second driving portions being connectable in flow communication with the combustion chamber, wherein the first configuration results in a motor speed of approximately 1500 RPM and a generator frequency of approximately 50 HZ and the second configuration results in a motor speed of approximately 1800 RPM and a generator frequency of approximately 60 Hz.

[c14] The portable power module of claim 1 wherein the container comprises a bottom portion, the portable power module further comprising a containment system positioned adjacent to the bottom portion to contain liquids and other substances within the container.

[c15] The portable power module of claim 1 wherein the container comprises a bottom portion, the portable power module further comprising a containment system positioned adjacent to the bottom portion to contain liquids and other substances within the container, the containment system including a containment member having a substantially horizontal portion and a plurality of substantially vertical portions contiguously attached to the horizontal portion around the perimeter of the horizontal portion.

[c16] The portable power module of claim 1 wherein the container comprises a bottom portion and wherein the portable power module has liquids on board during normal operation comprising the liquid coolant, motor lubricants, and water, the portable power module further comprising a containment system positioned inside the container adjacent to the bottom portion to contain liquids and other substances within the container, the containment system including a containment member having a substantially horizontal portion and a plurality of

substantially vertical portions contiguously attached to the horizontal portion around the perimeter of the horizontal portion to define a containment volume, wherein the containment volume can contain in the range of approximately 100% - 120% of the liquids onboard the portable power module during normal operation.

[c17] The portable power module of claim 16 wherein the containment volume can contain at least approximately 120% of the liquids onboard the portable power module during normal operation.

[c18] A portable power module trailerable over public roads, the portable power module comprising:

a rectangular shipping container including a first side portion spaced apart from an opposing second side portion, the container further including a top portion spaced apart from an opposing bottom portion, the top and bottom portions being connected to the first and second side portions to at least partially define a motor compartment;

a gaseous fuel motor positioned within the motor compartment, the gaseous fuel motor including a combustion chamber and a coolant jacket positioned adjacent to the combustion chamber to circulate liquid coolant;

an electrical power generator positioned within the motor compartment and drivably connected to the gaseous fuel motor, the generator configured to produce at least one megawatt of electrical power when driven by the motor at a selected speed in a normal operating configuration;

a radiator positioned within the container in flow communication with the coolant jacket, the radiator configured to receive the coolant from the coolant jacket and return the coolant to the coolant jacket;

an exhaust gas silencer positioned within the container and having an exhaust gas outlet positioned adjacent to the top portion of the container, the exhaust gas silencer connected in flow communication with the combustion chamber and configured to receive exhaust gases from the combustion chamber and vertically discharge the exhaust gases through the exhaust gas outlet away from the top portion;

a first air circuit including a first air inlet positioned on one of the first or second side portions to provide an ambient first air portion to the motor compartment, the first air circuit further including a first air outlet positioned adjacent to the top portion of the container to vertically discharge at least a portion of the first air portion away from the top portion; and

a second air circuit including a second air inlet positioned on one of the first or second side portions to provide an ambient second air portion proximate to the radiator to cool the coolant received from the coolant jacket, the second air circuit further including a second air outlet positioned adjacent to the top portion of the container to vertically discharge the second air portion away from the top portion.

[c19] The portable power module of claim 18 wherein the container has an overall length dimension of about 40 feet or less, an overall width dimension of about 8 feet or less, and an overall height dimension of about 9.5 feet or less.

[c20] The portable power module of claim 18 wherein the container is a standard forty foot shipping container.

[c21] The portable power module of claim 18 wherein the gaseous fuel motor includes a combustion air intake in flow communication with the combustion chamber configured to receive a first fraction of the first air portion, and wherein

the generator further includes a generator air intake configured to receive a second fraction of the first air portion.

[c22] The portable power module of claim 18 wherein the gaseous fuel motor includes a combustion air intake and a gaseous fuel inlet in flow communication with the combustion chamber, wherein the combustion chamber is configured to combust an air/fuel mixture comprising natural gas received via the gaseous fuel inlet and air received via the combustion air intake.

[c23] The portable power module of claim 18 wherein:

the generator produces at least approximately one megawatt of electrical power at 50 Hz when driven by the motor at a speed of 1500 RPM; and

the generator produces at least approximately one megawatt of electrical power at 60 Hz when driven by the motor at a speed of 1800 RPM.

[c24] The portable power module of claim 18 wherein the motor has a first motor speed associated with a first generator output frequency and a second motor speed associated with a second generator output frequency, the portable power module further comprising a frequency switching system allowing selection of the first generator output frequency by selecting the first motor speed or the second generator output frequency by selecting the second motor speed.

[c25] The portable power module of claim 18 wherein the gaseous fuel motor has a combustion air intake and a gaseous fuel inlet in flow communication with the combustion chamber and further comprising a turbocharger having a first configuration and a selectable optional second configuration, the first configuration including a driven portion mechanically coupled to a first driving portion and the second configuration including the driven portion mechanically coupled to a second driving portion that is optionally interchangeable with the first

driving portion, the driven portion being connected in flow communication with the combustion air intake, the gaseous fuel inlet and the combustion chamber, and the first and second driving portions being connectable in flow communication with the combustion chamber.

[c26] The portable power module of claim 18 wherein the gaseous fuel motor has a combustion air intake and a gaseous fuel inlet in flow communication with the combustion chamber and further comprising a turbocharger having a first configuration and a selectable optional second configuration, the first configuration including a driven portion mechanically coupled to a first driving portion and the second configuration including the driven portion mechanically coupled to a second driving portion that is optionally interchangeable with the first driving portion, the driven portion being connected in flow communication with the combustion air intake, the gaseous fuel inlet and the combustion chamber, and the first and second driving portions being connectable in flow communication with the combustion chamber, wherein the first configuration results in a motor speed of approximately 1500 RPM and a generator frequency of approximately 50 HZ and the second configuration results in a motor speed of approximately 1800 RPM and a generator frequency of approximately 60 Hz.

[c27] The portable power module of claim 18 further comprising a containment system positioned adjacent to the bottom portion of the container to contain liquids and other substances within the container.

[c28] The portable power module of claim 18 further comprising a containment system positioned inside the container adjacent to the bottom portion to contain liquids and other substances within the container, the containment system including a containment member having a substantially horizontal portion and a plurality of substantially vertical portions contiguously attached to the horizontal portion around the perimeter of the horizontal portion to define a

containment volume, wherein the containment volume can contain in the range of approximately 100% - 120% of the liquids onboard the portable power module when the portable power module is in the normal operating configuration.

[c29] A method for providing at least approximately one megawatt of electrical power at a site, the method comprising:

receiving a request to provide at least approximately one megawatt of electrical power at the site;

transporting a portable power module over public roads to the site, the portable power module comprising:

a gaseous fuel motor, the motor including a combustion chamber in flow communication with a combustion air inlet and a gaseous fuel inlet, the motor further including a coolant jacket positioned adjacent to the combustion chamber to circulate liquid coolant;

an electrical generator drivably connected to the motor, the generator configured to produce at least one megawatt of electrical power when driven by the motor at a selected speed;

a radiator in flow communication with the coolant jacket, the radiator configured to receive the coolant from the coolant jacket and return the coolant to the coolant jacket;

an exhaust gas silencer in flow communication with the combustion chamber, the exhaust gas silencer configured to receive exhaust gases from the combustion chamber and discharge the exhaust gases; and

a container trailerable over public roads, the motor, the generator, the radiator and the exhaust gas silencer being positioned within the container when the portable power module is being

transported to the site and when the portable power module is in a normal operating configuration at the site; and

releasably connecting a gaseous fuel source in fluid communication with the gaseous fuel inlet.

[c30] The method of claim 29 wherein transporting a portable power module to the site includes transporting the container having an overall length dimension of about 40 feet or less, an overall width dimension of about 8 feet or less, and an overall height dimension of about 9.5 feet or less.

[c31] The method of claim 29 wherein releasably connecting a gaseous fuel source includes releasably connecting a natural gas source.

[c32] The method of claim 29 further comprising:

operating the gaseous fuel motor at a motor speed in the range of approximately 1500 to 1600 RPM; and

generating at least approximately one megawatt of electrical power in the range of approximately 50Hz to 60Hz.

[c33] The method of claim 29 wherein transporting a portable power module to the site includes transporting the container having a top portion, and wherein the method further comprises:

operating the gaseous fuel motor;

providing an ambient first air portion to the combustion air inlet;

providing an ambient second air portion proximate to the radiator;

vertically exhausting at least a fraction of the first air portion through the top portion of the container; and

vertically exhausting at least a fraction of the second air portion through the top portion of the container.